

# Pharmacognosy In Brief

## Summary of Fruits



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# Fruits

## Definition:

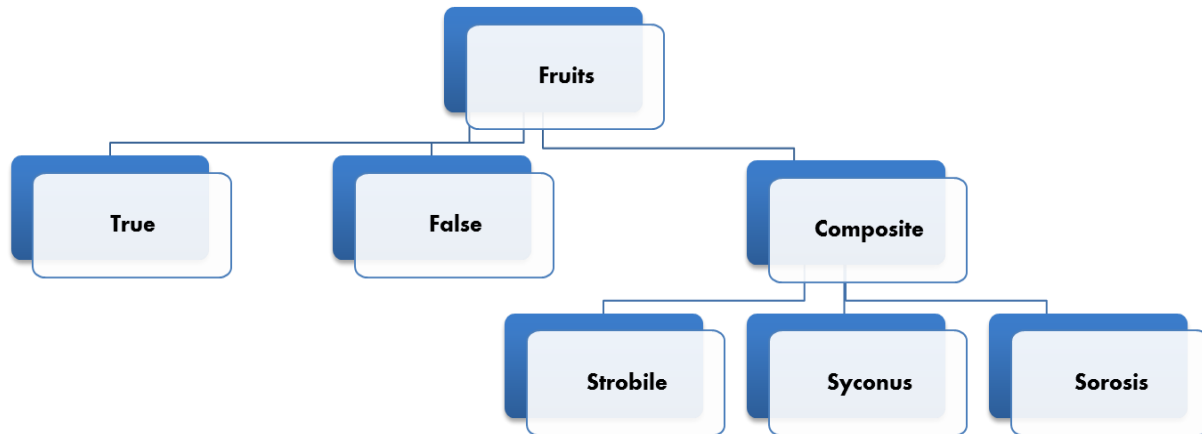
Plant organs resulting from fertilization of mature gyanicium (Ovary + Style + Stigma)

## Types of fruits

(1) False fruits: Resulting from gyanicium + recepticle e.g Pome fruits (apple)

(2) True fruits: Resulting from gyanicium only e.g. Citrus

(3) Compositous fruits: Resulting from fertilization of flowers on an inflorescence.



## True fruits are classified into:

(1) Simple fruits: Resulting from single ovary on a flower on one pedicle

### (A) Dry fruits

1- Dehiescent fruits: Open and release their seeds e.g

- Legume: splits along dorsal and ventral suture (senna pods),
- Siliqua: with a false septa (black mustard),
- Follicles (open by ventral suture),
- Capsules open by loculicidal valves e.g cardamom,
- Pyxis e.g hyoscymus by pores e.g poppy seeds)

2- Indehiescent fruits Don not open not release its seeds e.g.

- Caryopesis: Fusion of the testa with endocarp e.g. wheat grains.
- Achene: Testa free pericarp e.g. figs, strowberry.
- Samara: Winged memberane from pericarp
- Nut: Like achene but bigger
- Cypsela: Pericarp and testa are free
- Lomentum: Modified indehiescent legumes (e.g pea nut)

3- Schizocarpic fruits (Cremocarp): splitting into two parts each part is called mericarp each mericarp contains its seeds e.g umbelliferous fruits fennel and anise.

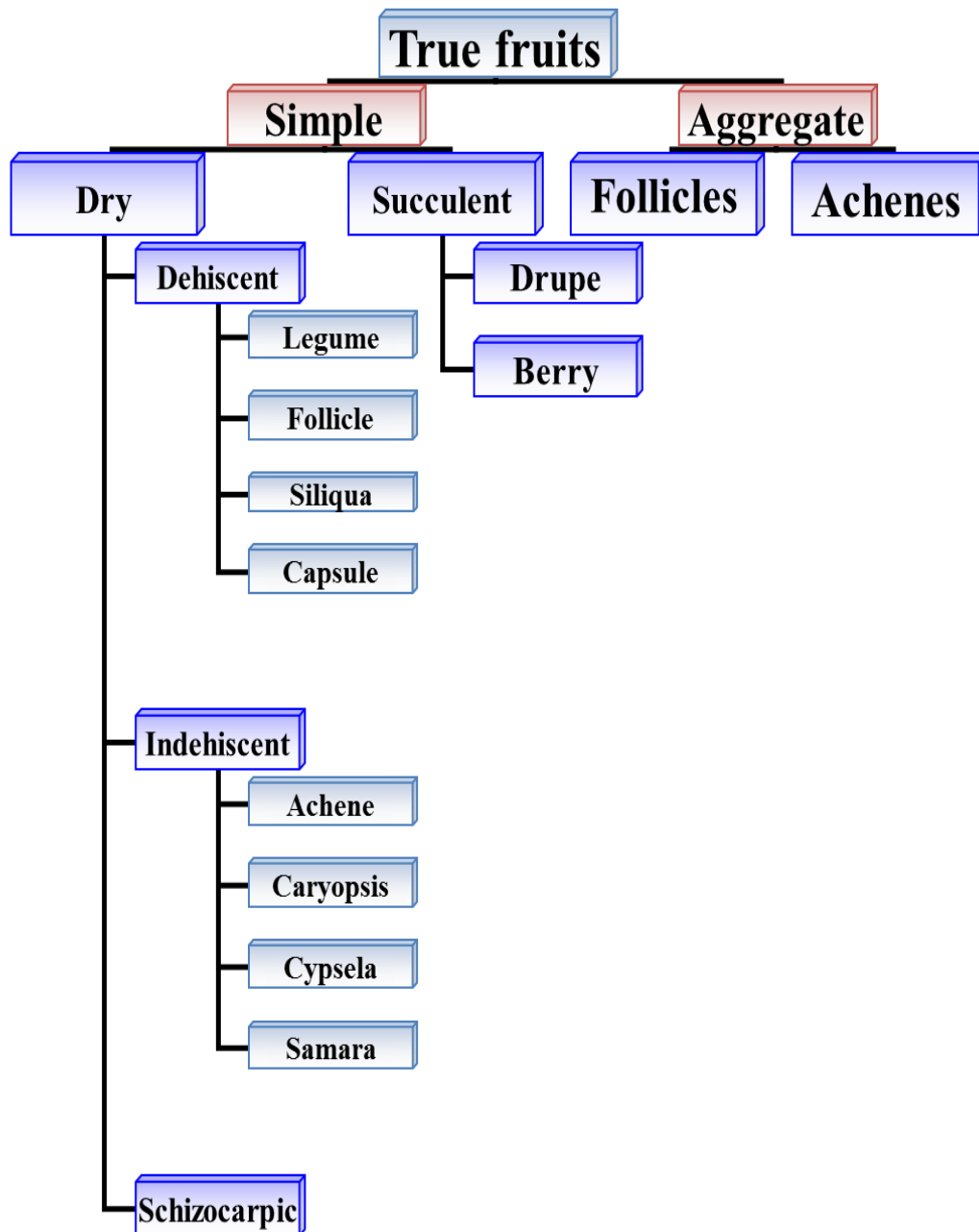
## (B) Succulent fruits (fleshy)

- **Berry** succulent with fleshy endocarp classified into:

- Hesperidium e.g Citrus, Colocynth and Capsicum
- Pepo: Pumpkin

- **Drupe** succulent fleshy mesocarp, hard endocarp e.g black pepper

N.B:- Parthenocarpic fruits fruits with no seeds e.g bannana



(II) **Aggregate fruits**: From 3-5 fruits on the same pedicle e.g. aggregate of follicles  
Star anise

**Compositous fruits**: Resulting from fertilization of flowers on inflorescence e.g.

- **Srobile**: large number of fruits on fleshy receptacle e.g. strowberry

- **Syconus:** large number of achene fruits inside fleshy receptacle e.g. figs
- **Sorosis:** large number of fruits on a spike type inflorescence e.g. long pepper

## Histology of fruits

### (A) Pericarp (3 layers)

#### (1) Epicarp

One layer of epidermal cells may be polygonal or isodiametric, with straight anticlinal walls, smooth cuticle (fennel) or striated cuticle (anise) or papillose (*Ammi majus*) with paracytic stomata (senna pods) anomocytic stomata (fennel), with hairs (anise, senna pods), or without hairs (colocynth), with content prisms (Black pepper, *Ammi majus*) or without content (Fennel, Capsicum)

#### (2) Mesocarp

\* Consists of Parenchymatous cells interrupted by one or more of the following layers:

- Collenchyma e.g. under primary ridges of umbelliferous fruits
- Vascular bundles e.g. under primary ridges of umbelliferous fruits, also V.B. in capsicum
- Vitteae (schizogenous ducts) in umbelliferous fruits, oil glands e.g. lemon peel, orange peel

\* Innermost layer of the mesocarp may be diagnostic for each fruit e.g.:

- Giant cells e.g. Capsicum.
- Porous layer e.g. *Ammi visnaga*
- Beaded e.g. Coriander
- Parenchyma contain prisms of Ca. oxalate forming crystal sheath (senna)

#### (3) Endocarp: May be diagnostic for each fruit e.g.

- Parquetory arranged in different planes (fennel, coriander, *Ammi majus*)
- Non-parquetory arranged in one plane (anise),
- Indistinct parquetory (*Ammi visnaga*),
- Sclerides (capsicum).
- Placenta cells: Dissipment

### (B) Seed (Testa and kernal)

**(A) Testa** (outer integument 1 or 2) it consists typically of 5 layers those are

#### (1) Epidermis (characteristic for each seed)

Filled with brown content e.g. umbelliferous fruits

Filled with mucilage e.g. black mustard, linseed

Prosenchymatous e.g. cardamom

Palisade like e.g. foenugreek

Sclerenchymatous e.g. capsicum, datura, hyoscymous

Sclerides carrying lignified hairs e.g. nux vomica, strophanthus

#### (2) Hypodermis (characteristic for each seed)

It may be collenchyma (linseed), collapsed parenchyma (*Nux vomica*) or basket like (Foenuugreek)

(3) **Sclerieds** it may be present or absent (characteristic for each seed)

With funnel shaped lumen and silica nodule (cardamom)

Unequal in length and thickning (black mustard)

Unequal in thickning (linseed)

(4) **Nutritive layer** (Collapsed parenchyma containing remains of reserved food materials e.g starch, oil droplets, aleurone layer )

(5) **Pigment layer** (may be present as in black mustard, linseed or absent as in white mustard )

**(B) Kernal (Perisperm + endosperm + embryo)**


(1) **Perisperm**: may be present, polygonal cells with straight anticlinal walls filled with starch grains like cardamom. Or may be absent like linseed.

(2) **Endosperm**: may be present, polygonal cells with straight anticlinal walls filled with aleurone grains and oil droplets (albuminous seeds e.g linseed ) or absent (exalbuminous seeds e.g black mustard)

(3) **Embryo**: present as small polygonal cells with thick straight anticlinal walls filled with aleurone grains and oil droplets.



Official Fruits

DRUG	ORIGIN	KEY ELEMENT, TEST	A.C , USES
<div>Fennel</div> <div>الشمر</div>	<div><div><input type="checkbox"/> Dried ripe fruits of <i>Foeniculum vulgare</i> F. Umbelliferae (F.Apiaceae)</div><div><input type="checkbox"/> <i>Foenum</i> = Hay      <i>culum</i> = fire</div><div><input type="checkbox"/> <i>Vulgare</i> = uncultivated</div><div><input type="checkbox"/> Umbelliferae = umbel shaped</div><div><input type="checkbox"/> Apiaceae from Apis = bees</div><div><input type="checkbox"/> Contraindicated in pregnancy</div></div>	<div><div>➤ Epidermal cells with anomocytic stomata + Simple vitteae + reticulate parenchyma (lignified) + parqutery endocarp</div><div>➤ Sudan III gives Red colour</div><div>➤ Adulterants: {Exhausted fennel} detected by low % V.O. - Sink in water - If rubbed between 2 fingers it will leave the artificial colour</div></div>	<div><div><input type="checkbox"/> V.O (Anethole + fenchone + Estragol)</div><div><input type="checkbox"/> Flavonoids (kaempferol.)</div><div><input type="checkbox"/> Antiflatulant</div><div><input type="checkbox"/> Carminative</div><div><input type="checkbox"/> Renal colic</div><div><input type="checkbox"/> Lactagogue</div><div><input type="checkbox"/> Anti-Inflammat.</div></div>
<div>Anise</div> <div>الينسون</div>	<div><div><input type="checkbox"/> Dried ripe fruits of <i>Pimpinella anisum</i> F. Umbelliferae</div><div><input type="checkbox"/> <i>Pimpinella</i> = bipinnate leaves</div><div><input type="checkbox"/> <i>Anisum</i> = confusion between dill and anise in plant morphology</div><div><input type="checkbox"/> Apiaceae = Apis = bees</div><div><input type="checkbox"/> It has estrogenic like activity so used as lactagogue</div></div>	<div><div>➤ Epidermal cells with anisocytic stomata + striated cuticle + Branched vitteae + non Parqutery endocarp + non glandular unicellular hair with warty cuticle</div><div>➤ Sudan III gives red colour</div><div>➤ Adulterants:</div><div>➤ Exhausted anise</div><div>➤ <i>Conium maculatum</i> or Hemlock (Smaller in size - No vitteae - Campylospermus endosperm - no hairs - mice like odour with KOH due to coniine alkaloid)</div><div>➤ <i>Conium</i> = konas = to whirl = vertigo</div><div>➤ <i>maculatum</i> = Spotted = Speckled</div><div>➤ hem = shore      leac = plant</div></div>	<div><div><input type="checkbox"/> Volatile oils (Anethole + Estragole)</div><div><input type="checkbox"/> Antispasmodic for babies</div><div><input type="checkbox"/> Sedative</div><div><input type="checkbox"/> Secretolytic</div><div><input type="checkbox"/> carminative</div><div><input type="checkbox"/> Cough</div><div><input type="checkbox"/> Lactagogue</div></div>
<div>Star anise</div> <div>Chinese Star Anise</div> <div>الينسون النجمي</div>	<div><div><input type="checkbox"/> Dried ripe fruits of <i>Illicium verum</i> F. schizandraceae (old name magnoliaceae)</div><div><input type="checkbox"/> <i>Illicium</i> = illicere = allure ment fragrance</div><div><input type="checkbox"/> <i>Verum</i> = true</div><div><input type="checkbox"/> Schizein = to cleave</div><div><input type="checkbox"/> andros = cleft anther cells.</div><div><input type="checkbox"/> magnoliaceae = Pierre Magnol</div></div> <div></div>	<div><div>➤ Sudan III gives red colour</div><div>➤ adultrant: japaneese star anise (toxic)</div></div>	<div><div><input type="checkbox"/> V.O {mainly anethole}</div><div><input type="checkbox"/> Carminative, antiflatulant</div><div><input type="checkbox"/> Anti-gripping</div></div>

DRUG	ORIGIN	KEY ELEMENT, TEST	A.C , USES
<b>Coriander</b> ثمار الكزبرة	<input type="checkbox"/> Dried ripe fruits of <i>Coriandrum sativum</i> F. Umbelliferae  <input type="checkbox"/> <i>Coriandrum</i> = korios = bugs odour <input type="checkbox"/> <i>sativum</i> = cultivated  <input type="checkbox"/> Coelospermous endosperm	<p>➤ Epidermal cells with beaded anticlinal walls and anomocytic stomata + Simple damaged vitteae + wavy crossed fibres + pitted innermost layer of mesocarp + parquetry endocarp</p> <p>➤ Sudan III red</p> <p>➤ Adultrants: exhausted coriander and Bombay coriander {Low % V.O.}</p>	<input type="checkbox"/> V.O {mainly linalool} <input type="checkbox"/> Flavonoids  <input type="checkbox"/> <b>Condiment</b> <input type="checkbox"/> <b>AntiFlatulant</b> <input type="checkbox"/> <b>Antispasmodic in laxative preparations</b>
<b>Ammi visnaga</b> <b>Toothpick</b> الخلة البلدي	<input type="checkbox"/> Dried ripe fruits of <i>Ammi visnaga</i> F. Umbelliferae <input type="checkbox"/> <i>Ammi</i> = Ammos = Sand <input type="checkbox"/> <i>Visnaga</i> = bi-pointed Stylopod <input type="checkbox"/> (Bitter taste - Inferior ovary - reflexed carpophore - anatropus ovule - Apical placentation - raphe - vitteae - orthospermous endosperm - lacuna over V.B.)	<p>➤ Porous innermost layer of mesocarp + simple vitteae + indistinct parquetry endocarp</p> <p>➤ Water extract + KOH pellets Blood red colour due to khellin</p> <p>➤ Alcoholic extract + Con H<sub>2</sub>SO<sub>4</sub> Lemon Yellow due to pyranocoumarins</p>	<input type="checkbox"/> Furanochromones (Khellin - visnagin) <input type="checkbox"/> - Pyranocoumarins (visnadin - samidin)  <input type="checkbox"/> <b>Renal colic - kidney Stones - Angina - Asthma - Hypertension</b>
<b>Ammi majus</b> الخلة البري	<input type="checkbox"/> Dried ripe fruits of <i>Ammi majus</i> F. Umbelliferae <input type="checkbox"/> <i>Ammi</i> = Ammos = Sand <input type="checkbox"/> <i>majus</i> = major  <input type="checkbox"/> (Has Pungent taste - Inferior ovary - anatropus ovule - raphe - Simple vitteae - endosperm orthospermous - Crown shaped V.B.)	<p>➤ Parquetry endocarp + Pappilosed epidermal cells striated with anomocytic stomata + prisms of Ca oxalate</p> <p>➤ Alcoholic extract under UV blue fluorescence</p>	<input type="checkbox"/> Furanocoumarins (Xanthotoxin, Bergapten)  <input type="checkbox"/> <b>Leukoderma, Vitiligo Alopecia</b>
<b>Capsicum</b> <b>Cayenne</b> الشطة	<input type="checkbox"/> Dried ripe fruits of <i>Capsicum annum</i> var. minimum F. Solanaceae  <input type="checkbox"/> Cayenne = to bite من الطعم الحار <input type="checkbox"/> <i>Capsicum</i> = capsa = box <input type="checkbox"/> annum = annual <input type="checkbox"/> Solanaceae = Sun rays	<p>➤ Lignified gut shaped endocarp, red oil droplets, innermost of mesocarp {Giant cells}</p> <p>➤ Purjency test destroyed by KMnO<sub>4</sub></p> <p>➤ *Alcoholic extract + Conc. H<sub>2</sub>SO<sub>4</sub> + Sucrose gives violet colour</p>	<input type="checkbox"/> Capsaicine phenolic alkaloid, carotenes and F.O <input type="checkbox"/> <b>Counter irritant</b> <input type="checkbox"/> <b>Antirheumatic</b> <input type="checkbox"/> <b>Acute rheumatism</b> <input type="checkbox"/> <b>Lumbago</b> <input type="checkbox"/> <b>Stomachic</b> <input type="checkbox"/> <b>Fat burner</b>

DRUG	ORIGIN	KEY ELEMENT, TEST	A.C , USES
<b>Colocynth</b> <b>Bitter apple</b> الحفظل	<input type="checkbox"/> Dried unripe but fully grown fruits of <i>Citrullus colocynthis</i> F. cucurbitaceae Deprived from its rind and seeds  <input type="checkbox"/> <i>Citrullus</i> = citrolus = cucumber <input type="checkbox"/> Greek kolokynthis = bitter gourd القوع المر = <input type="checkbox"/> Cucurbitaceae = cucurbita = gourd <input type="checkbox"/> unripe but fully grown to make peeling easy.	<p>➤ Pithy parenchyma + laticeferous ducts + oil droplets</p> <p>➤ *Mayer's test yellowish white p.p.t ➤ 80% H<sub>2</sub>SO<sub>4</sub> orange red</p> <p>➤ Adultrants: seeds {high % oils}, rind {high % sclerieds - low % active constituents}</p>	<input type="checkbox"/> {Cucurbiticns} <input type="checkbox"/> Steroidal saponins <input type="checkbox"/> Colocynthine Alkaloid <input type="checkbox"/> Resin  <input type="checkbox"/> <b>Hydragogue cathartic,</b> <input type="checkbox"/> <b>Cytotoxic - Anticancer</b> <input type="checkbox"/> <b>Anti-rheumatic</b>
<b>Senna pods</b> فشار السنّا	<input type="checkbox"/> Dried ripe fruits of <i>Cassia acutifolia</i> and <i>Cassia angustifolia</i> F. leguminoseae (Fabaceae)  <input type="checkbox"/> New name {Dried ripe fruits of <i>Cassia alexandrina</i> F. leguminoseae (Fabaceae)}  <input type="checkbox"/> Senna = Sainai = سينا <input type="checkbox"/> Cassia from qatsa = cut off <input type="checkbox"/> acutifolia = Leaflet with acute apex <input type="checkbox"/> angustifolia = Narrow Leaflet <input type="checkbox"/> Faba = bean <input type="checkbox"/> Leguminoseae = legume	<p>➤ Straight crossed fibers with prisms of Ca oxalate + non glandular hairs with warty cuticle.</p> <p>➤ Modified Borntrager's test red colour in aqueous Ammonical alkaline layer {Test for dianthrone Or sennosides}</p> <p>➤ Contraindication: Intestinal Obstructions - Heart disease}</p>	<input type="checkbox"/> Dianthrone glycosides <input type="checkbox"/> {Sennosides A,B,C,D} <input type="checkbox"/> Hydroxyanthracene glycosides  <input type="checkbox"/> <b>(laxitive in acute constipation)</b> <input type="checkbox"/> <b>For short time</b> <input type="checkbox"/> <b>Anal fissures</b> <input type="checkbox"/> <b>Weight loss</b>



Non-official Fruits

DRUG	ORIGIN	KEY ELEMENT, TEST	A.C , USES
Bitter orange peel قشر النارج	<ul style="list-style-type: none"><li><input type="checkbox"/> Dried rind of <i>Citrus aurantium</i> var. amara family rutaceae</li><li><input type="checkbox"/> <i>Citrus</i> = citron tree الانج</li><li><input type="checkbox"/> <i>aurantium</i> = aura = gold</li></ul>	<ul style="list-style-type: none"><li>➢ 2 rows of oil glands</li><li>➢ KOH {Yellow colour}</li><li>➢ <b>Histochemical test</b></li><li>➢ Conc HCl {green colour}</li><li>➢ <b>Histochemical test</b></li><li>➢ Bitter orange contains Synephrine (ephedrine like compound block satiety center in the brain) so you will not feel hungry and you will not eat. It also contains pectins which act as dietary fibre and swell by absorption of water also you will feel full and you will not eat so you will loose weight.</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> V.O,</li><li><input type="checkbox"/> Bitter principles aurantiomarin</li><li><input type="checkbox"/> Flavonoid hesperidin</li><li><input type="checkbox"/> Synephrine, tyramine, pectins and VitB</li><li><input type="checkbox"/> <b>Bitter tonic</b></li><li><input type="checkbox"/> <b>Capillary fragility</b></li><li><input type="checkbox"/> <b>Weight loss</b></li><li><input type="checkbox"/> <b>Stomachic</b></li></ul>
Lemon peel قشر الليمون	<ul style="list-style-type: none"><li><input type="checkbox"/> Dried rind of <i>Citrus limonis</i> family Rutaceae</li><li><input type="checkbox"/> <i>Citrus</i> from citron tree</li><li><input type="checkbox"/> <i>limonis</i> = lemon</li></ul>	<ul style="list-style-type: none"><li>➢ One row of schizolysigenous oil glands</li><li>➢ KOH Yellow colour</li><li>➢ Conc HCl no green colour</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> V.O,</li><li><input type="checkbox"/> Vit.C</li><li><input type="checkbox"/> Flavonoids</li><li><input type="checkbox"/> <b>Common cold, carminative, cosmetics</b></li></ul>
<i>Silybum marianum</i> Milk Thistle الحوشف البري	<ul style="list-style-type: none"><li><input type="checkbox"/> Dried ripe fruits of <i>Silybum marianum</i> F. compositae {Astraceae}</li><li><input type="checkbox"/> Milk thistle = Milky leaves</li><li><input type="checkbox"/> <i>Silybum</i> = edible thistle</li><li><input type="checkbox"/> <i>marianum</i> from saint Mary</li></ul>	-----	<ul style="list-style-type: none"><li><input type="checkbox"/> Flavolignans Silymarin, silybin)</li><li><input type="checkbox"/> <b>Hepatoprotective</b></li><li><input type="checkbox"/> <b>Digestive</b></li><li><input type="checkbox"/> <b>Antioxidant</b></li><li><input type="checkbox"/> <b>Anti-cancer</b></li><li><input type="checkbox"/> <b>Cholagogue</b></li></ul>

DRUG	ORIGIN	KEY ELEMENT, TEST	A.C , USES
<b>Vanilla pods</b> ثمار الفانيليا	<input type="checkbox"/> Dried cured fruits of <i>Vanilla planifolia</i> F. orchidaceae <input type="checkbox"/> <i>Vanilla</i> = little pod مثل القدم الصغيرة <input type="checkbox"/> <i>Planifolia</i> = flat-Leaved <input type="checkbox"/> Orchidaceae = Orchid flowers <input type="checkbox"/> Curing process converts the non-volatile glucovanillin and glucovanillic alcohol into vanillin (volatile)	➤ Test for V.O Sudan III      RED ➤ Adulterant: green vanilla pods with no odour no free vanillin	<input type="checkbox"/> Volatile oils {mainly Vanillin} <input type="checkbox"/> Flavouring agent <input type="checkbox"/> Antioxidant
<b>Hops</b> حشيشة الدنيا	<input type="checkbox"/> Dried strobiles of <i>Humulus lupulus</i> F. Cannabinaceae <input type="checkbox"/> Hop = hoppan = to climb <input type="checkbox"/> <i>Humulus</i> = humus <input type="checkbox"/> <i>Lupulus</i> = small wolf	-----	<input type="checkbox"/> V.O {mainly humulene} <input type="checkbox"/> Bitter principles <input type="checkbox"/> {Humulol and lupelol} <input type="checkbox"/> Sedative, <input type="checkbox"/> Bitter stomachic
<b>Poppy capsule</b> كبسولة الخشخاش	<input type="checkbox"/> Dried unripe but fully grown fruits of <i>Papaver somniferum</i> F. Papaveraceae <input type="checkbox"/> <i>Papaver</i> = poppy = to swell كبسولة منتفخة <input type="checkbox"/> <i>Somniferum</i> = bringing sleep	➤ Test for meconic acid (FeCl <sub>3</sub> test) blood red colour.	<input type="checkbox"/> Opium Latex {morphine and codeine} <input type="checkbox"/> Hypnotic, <input type="checkbox"/> Narcotic analgesic <input type="checkbox"/> (Causes respiratory depression on large dose)

DRUG	ORIGIN	KEY ELEMENT, TEST	A.C , USES
<p>Hawthorn Hawthorn berry زعور الأودية</p>	<p>❑ Dried fruits of <i>Crataegus monogyna</i> = <i>C. oxyacantha</i>) Family Rosaceae</p> <p>❑ <i>Crataegus</i> = Kratos = strengthened wood خشب قوي</p> <p>❑ <i>monogyna</i> = uniseeded</p>	<p>-----</p>	<p>❑ Procyanidins</p> <p>❑ Flavonoids {Hyperosides}</p> <p>❑ Amines (cardiotonic action).</p> <p>❑ Catechins and epicatechins {Tannins}.</p> <p>❑ Cardiac insufficiency</p> <p>❑ Angina pectoris.</p> <p>❑ Arteriosclerosis.</p>
<p>Wheat grains حبوب القمح</p>	<p>❑ Dried ripe fruits of <i>Triticum sativum</i> and <i>Triticum vulgare</i> F. gramineae</p>	<p>➤ Rounded Shaped Starch, + Aleurone layer + non glandular unicellular hair with smooth cuticle</p> <p>➤ I<sub>2</sub> test for starch Blue colour</p> <p>➤ Picric acid for protein Yellow</p> <p>➤ Sudan III for fixed oils Red</p>	<p>❑ Starch</p> <p>❑ Protein</p> <p>❑ PUFA wheat germ oil from freshly grinded embryo</p> <p>❑ VITE</p> <p>❑ Bran (bulk fibers)</p> <p>❑ Bran {Bulk laxative - Hemorrhoids}</p> <p>❑ wheat germ oil {anti-anemic, Aging, threatened abortion}</p>
<p>Artichoke الخرشوف</p>	<p>❑ Leaves and flowers of <i>Cynara scolymus</i> F. Astraceae</p>	<p>-----</p>	<p>❑ Cynarin {polyphenolic glycoside}</p> <p>❑ Phenolic compounds</p> <p>❑ Cholagogue</p> <p>❑ Antihypercholestermic</p> <p>❑ Hepatoprotective</p> <p>❑ Digestive (Dyspepsia)</p>